READYING MICHIGAN TO MAKE GOOD ENERGY DECISIONS

Staff Comments to Governor's Task Force
Energy Efficiency Section
Regulated Energy Division

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MICHIGAN PUBLIC SERVICE COMMISSION
Department of Energy, Labor & Economic Growth

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MICHIGAN PUBLIC SERVICE COMMISSION

In its comments herein, Staff will address five foundational policy issues:

(1) Has the EO program been successful?

(2) Is the EO program likely to continue to be successful, (i.e. are energy efficiency resources in Michigan abundant and likely to be economically procured?

(3) Has experience with small utilities shown that EO programming can be successfully implemented for this utility sector?

(4) Does Michigan have the necessary economic/technical studies necessary to quantify changes in future EO programing requirements?

(5) Does the EO program serve to promote Michigan's economic and environmental interests?

Staff's answers to these foundational issues are based on reasoned judgment and experience, data and information contained in provider filings with the Commission, and technical/economic studies relating to energy efficiency.

Background –The Commission Staff's Unique Role in the EO Process

Over the past four and 1/2 years, the Commission Staff has worked closely with the 62 utilities subject to filing Energy Optimization plans with

the Commission, and in addition has overseen the alternative compliance payment program for 22 small utilities (Efficiency United). The Staff has reviewed all EO Plan and Reconciliation filings filed with the Commission, audited EO Reconciliation filings, and reviewed all provider annual reports. In addition, the Staff oversees a statewide collaborative that meets on a monthly basis to coordinate the implementation of programs, to develop a statewide energy measures database (MEMD), and to share best practices. Stakeholders participating in the EO Collaborative include utilities, interveners to EO Plan and Reconciliation proceedings, and other representatives of such as environmental organizations, home performance and HVAC contractors, vendors and implementation contractors, and energy services companies (ESCOs).

Since passage of PA 295, the Staff has worked with providers to actively promote conservation and energy efficiency in Michigan. Partnerships include efforts targeting industrial customers, enhancing multi-family programs, and encouraging new energy efficiency technologies.

Staff has interfaced with all customer segments, including residential, commercial and industrial customers, through discussions with customers to assess their perspectives on the EO program, and get their recommendations for improvement. Because many energy efficiency technologies require

substantial up-front capital investment, the Staff developed the initial framework for a statewide EE financing program, which resulted in the creation of Michigan Saves. In addition, Staff has worked closely with small utilities, including rural electric cooperatives and municipal utilities, to improve the administration of their programs, increase program effectiveness and reduce implementation costs.

Policy Issue (1): Has the Energy Optimization program been successful?

Yes. Based on the Commission Staff's extensive involvement and unique position regarding program compliance, it is our position that the EO program has been an outstanding success. EO programs have been successful in promoting energy efficiency, accelerating market transformation toward high efficiency products, and educating utility customers regarding effective and economic options.

Based on data developed by or reviewed by independent energy-efficiency evaluation contractors and filed by EO providers, Staff is confident that the EO programs will reduce the cost-of-service to utility customers over the weighted-average lifecycle of program measures. The most recent data reviewed by Staff, for program year 2011, demonstrates that for every dollar of EO funding provided by EO surcharges, utilities will

avoid $3.55 in capital costs, fuel and purchased power. Another way of looking at the cost of service benefits of EO programming is in terms of the aggregate cost-of-service reduction. For example, in 2011, the statewide EO spending of approximately $205 million in will result in lifecycle savings in wholesale energy costs of $709 million on a net present value basis. The net cost-of-service reduction to utility customers is $504 million on a present value basis. In 2012, EO spending increased to $255 million due to the ramp-up in minimum energy savings targets. Although final reports for 2012 are in the process of being filed by providers, preliminary indications are that the lifecycle savings will increase slightly from the 2011 results. As programming continues through 2013 and beyond, Staff expects the benefit/cost ratio (utility system cost test) to drop moderately in response to a change in efficiency measure mix: from short lifecycle measures (low hanging fruit) toward longer lifecycle measures and comprehensive installations which require higher rebate/incentive levels. This raises the second policy issue.

Policy Issue (2): Is the EO program likely to continue to be successful, (i.e. are energy efficiency resources in Michigan abundant and likely to be economically procured in future years)?

Yes, Staff is confident that EO programs can continue at the current level of annual spending into the future.

During the early years of EO programming, (2009-2012) providers focused on customer awareness of the new programs and easy to implement measures that would introduce customers to energy efficiency. Necessarily, easier to implement and low-cost measures, such as direct install kits and compact fluorescent-lighting, dominated EO portfolios. Only a small fraction of EO spending was directed toward long-lifecycle measures.

Going forward, EO programming will be increasingly focused on long-lifecycle measures, and importantly, multi-measure installations and retrofits producing deep energy savings. Gravitating toward long-lifecycle measures will substantially increase cumulative demand reductions over a five to ten-year period. In particular, this change in program character will accomplish the key legislative objective of delaying or reducing the need to build new electric power plants that was substantially missing from the early EO program ramp-up period. As a result, Michigan has only marginally drawn upon the energy efficiency potential derived from long-lifecycle measures such as improved building envelope, total home performance, LED lighting, and revamping industrial process improvement. Early

program data shows quite strikingly that in the industrial sector, the vast majority of measures receiving EO program incentives were for lighting.

In order to gather actual field data to quantify measure saturation and penetration, the MPSC commissioned a statewide energy-efficiency baseline study for the residential and commercial sectors, which was completed in 2011. The study was performed by Cadmus[1], included 2,000 household phone surveys and 1,069 on-site surveys of households; 1,000 commercial building phone surveys and 289 on-site commercial surveys of multiple sectors (i.e. office, warehouse, and restaurant). The study was comprehensive, and included appliances, lighting, plug load, and building envelope. Highlights of the commercial sector study include:

- *Over half of respondents' companies own and occupy their facilities. Lodging businesses are most likely to own their facilities (83 percent), and ownership often plays an important factor in an organization's ability to undertake energy-efficient actions.*

- *One-third of businesses report they are not at all familiar with (utility) programs.*

- *Warehouses have been impacted by the economic downturn, and only 13 percent have a corporate energy policy.*

- *Approximately 31% of buildings use commercial refrigeration equipment.*

- *Less than 10% of grocery stores have heat recovery systems, high efficiency evaporator fans, or floating head pressure controls.*

[1] Michigan Residential Energy Baseline Study, July 2011; Michigan Commercial Baseline Study July 2011

For the residential sector the baseline study highlights include:

- *Homes in the Upper Peninsula have the highest average attic insulation R-value, at 33.2. The remaining 5 Michigan regions have average attic insulation R-values ranging from 26 to 29.*

- *Sidewall R-value is between 12 and 15 across the state.*

- *56% of residences have central air conditioners.*

- *Heating systems in the Southeast region are markedly older than heating systems in other regions, with only 12% of units in this region being less than two years old, and 22% of units more than 19 years old.*

- *Electric heating, which includes baseboards, central forced air furnaces, portable heaters, and radiant floor heating, is most common in multifamily homes.*

- *38 percent of homes have secondary heating systems. These include portable electric heaters or some type of fireplace, either gas or wood-fired.*

- *Saving energy is very important to 63% of Michigan residents.*

- *Over half of Michigan residents strongly agree that the money they can save on their energy bills will pay for the cost of making improvements to save energy.*

- *Over 30% of residents agree they would like to do more to use less energy.*

- *The majority (87 percent) of residential water heater temperature settings fall within the medium to medium-high range.*

- *Almost all of the water heaters in Michigan homes (96 percent) were standard tank-type units; all other units, such as tankless, solar, gas condensing, and indirect, make up less than 4 percent.*

A review of the 2011 State of Michigan baseline-studies, in concert with utility EO plans/annual reports/evaluation studies suggests that the limited focus of initial years' EO programming on easy to implement & inexpensive measures, leaves the majority of poor performance baseline-benchmarks relatively intact, in particular those that require substantial up-front capital investment, and longer payback periods. Such untapped energy efficiency potential remains available for future years' EO programming, although significant changes in EO program structure will be required to realize such potential. Changes may include enhanced financing options for customers, larger rebates for long-lifecycle measures, and recognition of the lifecycle energy savings in meeting annual energy savings targets.

Additionally, new technologies are rapidly replacing the standard offers for traditional EO programming. In particular, solid-state lighting shows promise as the most significant advancement in lighting since the Edison incandescent bulb was invented. The current envelope of technology marginally exceeds 100 lumens per watt in actual field performance, which is approximately 40% efficient. (For comparison, a 100 watt equivalent, 24 watt CFL, is about 62 lumens per watt, or 25% efficient.) Expectations are

for LED technology to meet 200 lumens per watt by 2020, which is about 80% efficient. As a result, LED's are expected to be a cornerstone of future EO programming for all customer segments, including residential, commercial and industrial. Additionally, wireless lighting controls are just now being introduced in Michigan, with several installations in both the Lower and Upper Peninsula. Wireless controls have demonstrated ability to extract additional energy efficiency savings, primarily when combined with solid state lighting, using instant on/off capability and wide turn-down capability for dimming applications.

Policy Issue (3): Has experience with small utilities shown that EO programming can be successfully implemented for this utility sector?

Yes, Michigan experience with small utility implementation of Energy Optimization programs has demonstrated that programs can be successfully implemented. Importantly, they can be as successful, or more so, than large utility programs – if the small utilities jointly implement programming, including plan design and implementation. Joint implementation allows small utilities to spread common costs over a larger base, and enables innovative programming such as manufacturer buy-downs, that would be unachievable for a small utility acting independently.

Michigan has 57 small utilities implementing EO programs, 39 are implementing an EO program through Section 71- Section 89 of PA 295, which requires the filing of an Energy Optimization plan on a biennial basis; and 20 small utilities are implementing an EO program through the state selected administrator, Efficiency United, pursuant to Section 91. Small utility performance during years 2009-2012 (start-up & ramp-up) showed mixed performance, with some utilities meeting and exceeding targets, and some falling short.

The majority of small utilities outsourced program design and implementation to companies specializing in energy efficiency services, and because Michigan had a virtual vacuum in the EE program services industry, implementation fell to out-of-state companies that duplicated programing done in other states. The lack of direct Michigan experience, contributed to implementation difficulties. This held true for the large utilities also, but difficulties were magnified in small utility programs. In response, over the past four years, implementation contractors have established a Michigan presence; hired Michigan based staffing, and crafted programming that was Michigan specific.

The early focus on “low hanging fruit” such as CFL light bulbs induced rapid market saturation in the geographically limited service

territories of small utilities. This issue was also evident in the large utility programs, but again, substantially magnified in small utility EO programs. A key lesson on this is the need to develop a balanced portfolio of both long-term and short-term measures.

The above issue, combined with the exclusive use of 1st year savings, in calculating whether statutory targets had been met, created the illusion that programming could not continue at the same level of expenditure in future years. From a small utility perspective, it appeared that targets would have to be substantially reduced, or eliminated, going forward.

The use of 1st year savings to calculate performance rendered many long-lifecycle measures uneconomic. This is because only a fraction of the lifecycle savings is recognized in the first year of installation. This administrative shortcoming essentially removed long-lifecycle measures from consideration. At the same time, focusing on low-cost and short-lifecycle measures would quickly saturate the market for such measures in small-utility service territories. This issue can be resolved, in part, by changes in the way energy savings are determined, and through the implementation of a balanced portfolio. Fortunately new energy efficiency technologies are being introduced that are creating new market opportunities. Full resolution will require additional program modifications.

Small utilities also saw difficulties in the commercial and industrial sector. Many small utilities have very large commercial and industrial customers. Some of these customers have an energy demand similar to the largest customer class of the major gas and electric utilities in the state; thus these customers' energy efficiency projects can be of substantial scope and investment. However, the major utilities can draw EO funding from a large and diverse array of customers, whereas small utilities cannot. This limited the ability of small utilities to provide adequate funding to large customer efficiency projects. Resolution of this issue required providing additional flexibility to draw EO funding from multiple years, allowing projects to proceed over a multi-year period. Additional programming efforts related to financing large energy efficiency projects is warranted. In addition, transfer of funding between the residential and C&I customer classes may be appropriate for small communities whose local economies are highly dependent upon a single (or few) industrial facility. Small utility EO programs have demonstrated that a comprehensive or deep energy savings project can retain a key industrial plant, and the jobs they create, in the state.

Efficiency United made substantial improvements and enhancements to its program over the last several years, so as to better serve its small utility partners. In 2013, Efficiency United is piloting a major shift in

programming toward long-lifecycle and comprehensive energy savings. The pilot will test a state-of the-art program design to resolve the major issues facing small utility programs, and create a model for sustainable programming for both small and large utilities. It is the Staff's view that the Efficiency United EO program has developed into one of the best small utility programs in the United States.

Policy Issue (4): Does Michigan have the economic/technical studies necessary to quantify changes in future EO programing requirements?

As of the date of these comments, Michigan does not have adequate technical data to support substantial changes in future EO program requirements. However, significant on-site data is available from the 2011 Energy Efficiency baseline study for residential and commercial buildings. The baseline study measures, through field survey of buildings across the state, the current penetration and saturation levels of key energy consuming appliances, plug load, and building envelope insulation measures.

The baseline study is considered a foundational input to an energy efficiency potential study. A state of Michigan potential study was commissioned by the MPSC in 2011, and partially completed. The work was done by GDS Associates. DTE and Consumers Energy are funding the

completion of the study. Study results and final reports are scheduled to be available in the September - October 2013 time frame. The study will provide detailed estimates of energy efficiency resources in Michigan over a five-year horizon (on a MWh and Mcf basis); and rate of acquisition, cost of acquisition, and avoided cost estimates. These parameters are essential to an informed policy analysis.

Additionally, electric energy efficiency resource data (from a potential study) could be merged into a dynamic Integrated Resource model (IRP) that finds the minimum net-present-value (NPV) of meeting future electric demand, subject to given policy constraints. An IRP can facilitate a determination of the economic level of energy efficiency resources vis-à-vis available power plant options. Thus, an IRP can be used as a tool to establish energy efficiency targets. Many states require an IRP to be performed on a regular basis, typically 3-5 years. *See figure 1*

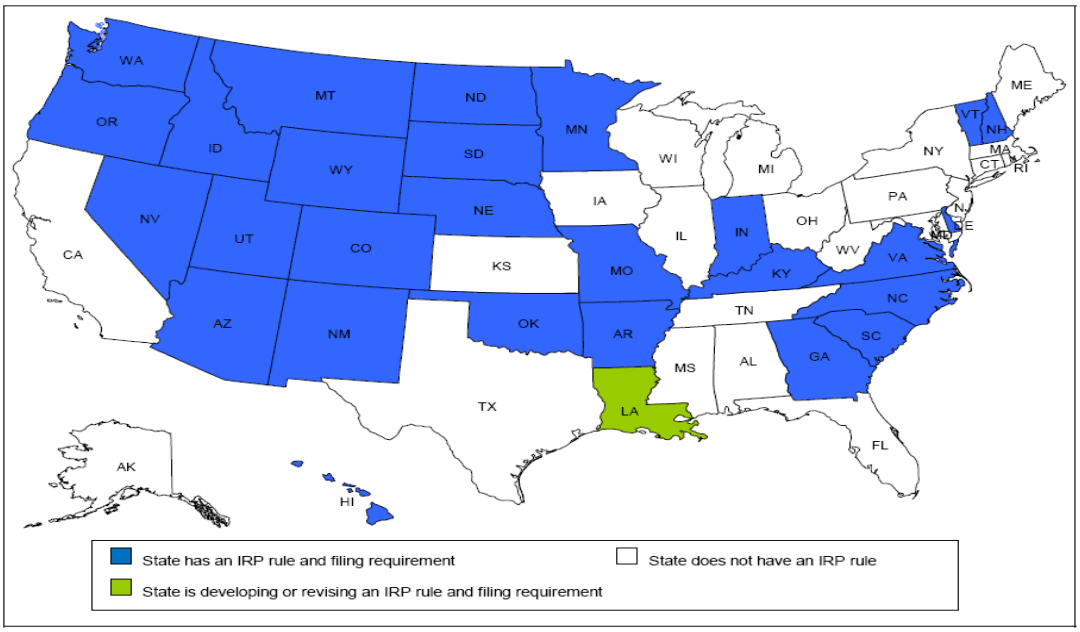

Figure 1 Presence or Absence of State Integrated Resource Planning Rules.

If, however, an energy efficiency spending cap is set at a given nominal level (based on public policy considerations), and energy efficiency resources are available within that spending cap at levelized costs significantly lower than the marginal cost of new generation(based upon an energy efficiency potential study); then an IRP is not necessary. This follows because energy efficiency, by definition, is first in the resource loading order. An energy efficiency potential study is adequate to verify the established EO spending level. In this regard, PA 295 is an example of a policy mandate that established a spending cap, without reference to a formal quantification of the maximum economic resource.

On the contrary, if it was determined that it is necessary to quantify the maximum level of energy efficiency resources that could economically be procured (on a NPV basis), then an IRP is desirable, if not required. This is done in practice by letting the level of energy efficiency resources float in the IRP model, in the same manner as supply-side resource options. The cost curve emanating from a potential study would be an input to the IRP model.

Policy Issue (5): Does the EO program serve to promote Michigan economic and environmental interests?

Michigan data from four years of Energy Optimization programming amply demonstrates that energy efficiency can meet energy demand at a fraction of the cost of supply-side options, such as central station power plants. EO resources have been procured at a levelized cost of less than $20 per MWh. This is below the current (depressed due to oversupply) cost of power in the MISO wholesale market; and substantially less than the cost of construction of new gas combined cycle or advanced supercritical coal power plants.

Energy efficiency is also the least cost option for reducing greenhouse gas emissions. McKinsey & Company, a global management consulting firm, has rigorously developed marginal abatement cost curves for greenhouse gas emissions. McKinsey cost curves have shown that energy

efficiency is the only option that can reduce CO2 emissions at a negative net cost; i.e. energy efficiency is the only option that actually reduces the cost-of-service to customers, and thus should be pursued irrespective of CO2 emissions requirements. *See figure 2*

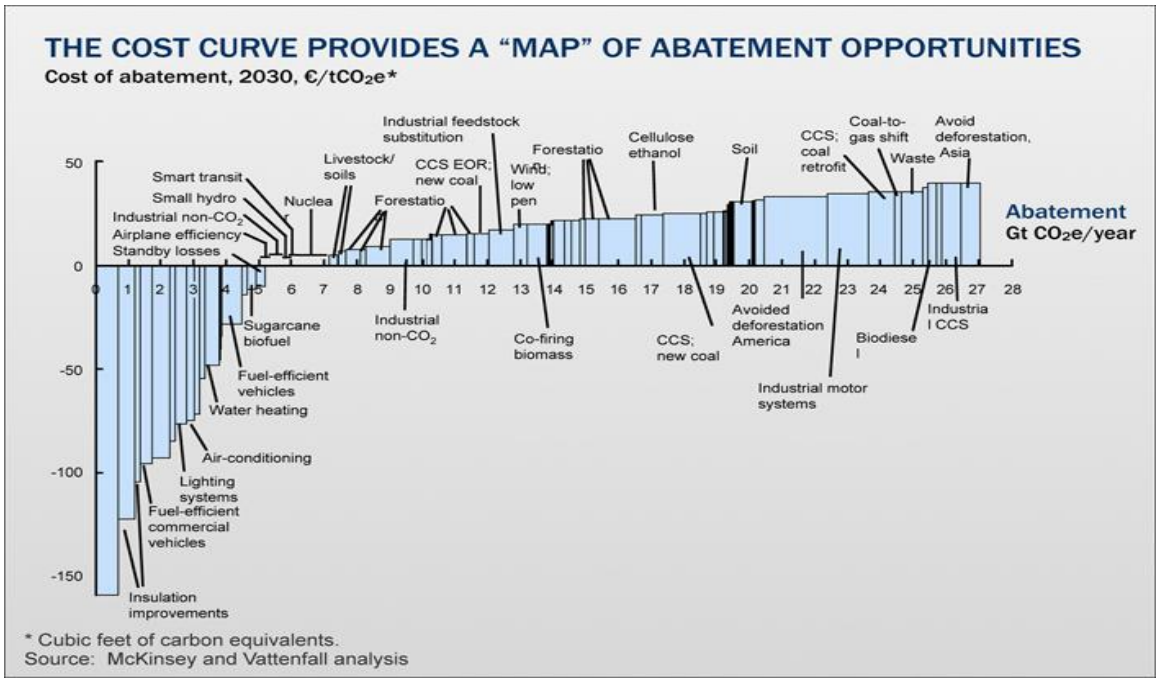

Figure 2 U.S. Greenhouse Gas Abatement Mapping Initiative, 2007

A macro-economic analysis of Energy Optimization programs was recently performed by Optimal Energy[2] so as to gauge the effect of EO programs on Michigan's economy. Highlights of the report include:

- Some durable efficiency measures continue to produce energy savings for 20 years or longer, so the economic impacts occur over that time period. Over the course of those 20 years, residents and businesses participating

[2] Economic Impacts of PA 295 Investments in Michigan, Optimal Energy Inc., AngelouEconomics, October 25, 2011

in the EO programs are estimated to save over $1.09 billion in energy related spending.

- A one year investment is estimated to create, over a 20 year period, a net gain of 101 job-years per million-dollars of program spending and a net increase of more than seven dollars of cumulative Gross State Product (GSP) for every dollar spent.

- In general, energy optimization investments create net positive economic impacts in a given region. In other words, usually more jobs are created through these projects than are lost by the activities they displace, such as electric generation or the sale of fuel oil, or spending on other goods and services rather than paying more for efficient equipment. This net positive impact is due to the fact that participants save money on their energy bills, and usually more of the dollars spent on energy optimization remain in the local economy than dollars spent on "traditional" electric generation or fossil fuel purchases.

- Total Jobs (job-years) over lifetime: 13,131
- Gross State Product (million) over lifetime: $983
- Personal and Proprietary Income (million) over lifetime: $601
- Output, or Business Sales (million) over lifetime: $1,816

- For each million dollars spent on EO programs, 101 jobs/year are created. This yields a lifetime total of 13,131 from EO programming for 2010 alone.

- For each dollar spent on EO programs, there is a net increase of:
  - Over seven dollars of cumulative Gross State Product (GSP),
  - Over four dollars of income from wages and due to energy savings, and
  - About 14 dollars of business output.